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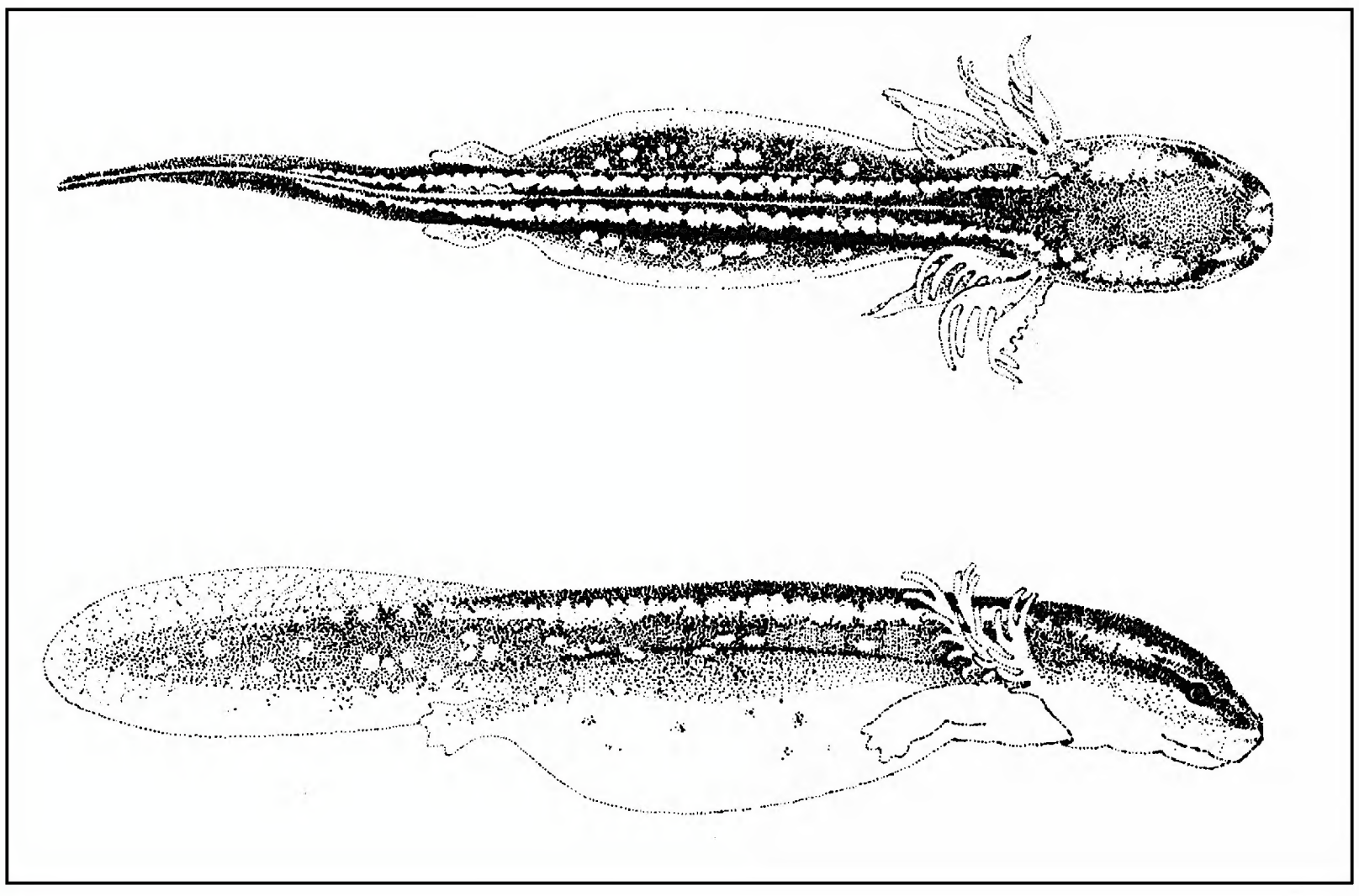

BULLETIN OF THE CHICAGO HERPETOLOGICAL SOCIETY
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Notes on a Bite by a Western Ribbon Snake (*Thamnophis proximus proximus*)

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On 6 June 2007 I observed an adult (50 cm TL) western ribbon snake (*Thamnophis p. proximus*) in light underbrush near the shores of a large lake complex in Kaufman County, Texas. When I captured the snake for photographs, it bit my left thumb. Experiencing only a slight sting-like pain, I decided to let the rather small specimen "hang on" while I found a suitable container in which to secure it. The bite lasted approximately 4–5 minutes after which time a container was finally located.

Within 1–2 hours after arriving home I noticed my left thumb, the upper backside of my hand, and lower wrist were noticeably swollen (Figures 1 and 2). Twenty-four hours later, several purple-to-red bruises were observed on the inside of my forearm (Figures 3 and 4). A slight radiating pain could also be felt at this time from my wrist to my elbow, a discomfort that lasted several days. Within 48 hours a pronounced soreness developed in the area of my left armpit. All symptoms disappeared within 7 days post bite and the snake was later released.

At least three other species of *Thamnophis* have been implicated in colubrid envenomations and/or immunological reactions with symptoms including ecchymosis, edema, lymphadenopathy, and pain (Chiszar and Smith, 2002; Campbell and Lamar, 2004). Although I have experienced pain, bleeding and local swelling involving bites from eastern garter snakes (*Thamnophis s. sirtalis*) as a child, a possible difference in this instance was the length of time I allowed the snake to retain its hold while I searched for a container in which to secure it.

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Campbell, J. A., and W. W. Lamar. 2004. The venomous reptiles of the Western Hemisphere. Ithaca, New York: Cornell University Press.

Chiszar, D., and H. M. Smith. 2002. Colubrid envenomations in the United States. Journal of Toxicology: Toxin Reviews 21(1-2):85-104.

Figure 1. Teeth puncture marks are approximately mid-thumb.

Figure 2. A comparison of the right and left hands showing swelling of left thumb, hand and wrist area.

Figure 3. Bruising on the inside of the left forearm.

Figure 4. Closer view of the forearm bruising.

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An Overview of Concerns and Issues Relating to the Mudpuppy, *Necturus maculosus maculosus*, in Lake Erie / Presque Isle Bay, Erie County, Pennsylvania

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Abstract

Mudpuppies (*Necturus maculosus maculosus*) are occasionally unintentionally caught in the Erie, Pennsylvania, area particularly during the fall of the year and continuing into winter by people fishing for yellow perch or burbot. These large amphibians are often caught around the channel that connects Presque Isle Bay to Lake Erie. Unfortunately, fishermen often do not put them back into the water unharmed. In addition to incidental catches by fishermen, dead mudpuppies have been observed on our area's beaches (summer and fall). The dead mudpuppies along the beaches apparently were victims of botulism poisoning and/or low oxygen levels in the lake. Other factors that seemingly may be working against this creature are discussed. However, the biggest threat to their long term survival may come from invasive species. In particular, the round goby (*Neogobius melanostomus*) is extremely abundant. This invasive species of fish is a rather recent addition to a long list of exotic species in our area. It has very powerful jaws and is an aggressive feeder. If the gobies prey on young mudpuppies (or in the future "learn" to feed on them) the effect could be a catastrophic decline in Lake Erie's mudpuppy population.

My first memory of a mudpuppy was circa 1949. I was about 6 years old, and I was ice fishing on Erie's Presque Isle Bay with my dad. We were fishing in an area with a depth of about 5 to 6 m (16 to 20 ft), well off the mouth of Cascade Creek in Erie. We had been fishing for yellow perch with emerald shiners, and kept our bait on or very near the bottom. I had a bite and pulled up a squirming slimy snakelike "fish"—with feet! It was about eight inches long. I was startled to say the least. However, seemingly my problems were to get worse. My dad saw what I caught and said something to the affect that I "must be a black cat." Of course he was joking, but to a little child that had neither seen such a creature before, nor heard the expression "black cat" as related to a fisherman's luck. I figured that whatever it meant it certainly was not a good thing.

I practically had tears in my eyes as I thought I had possibly been somehow marked for life by catching this seemingly vile creature. My tears never came, because I became fascinated as I watched my dad unceremoniously take the "thing" off my hook and throw it out squirming on the ice. He explained that it was a "mudpuppy." When I heard its name like that I felt a little better. People generally have a fondness for puppies. Within seconds a gull swooped down to the ice and picked up my interesting catch. The gull was obviously happy for a free meal. I asked why we didn't keep the mudpuppy or put it back. I was told that we did not eat them but that gulls were hungry, and that is what usually happens to mudpuppies when fishermen catch them. Thankfully, I realized at that moment in time, that at least some other fishermen had also caught such a creature.

Since that memorable day I have caught other mudpuppies, but without the excitement and wonder associated with that first catch. I have also developed a soft heart for these seemingly unattractive creatures. Many years passed since that unforgettable day, and mudpuppies for a time were more or less forgotten.

Mudpuppies are large salamanders that live out their lives in the water. They are a native species in the Erie County, Pennsylvania, area, and are found in Lake Erie, as well as Presque Isle Bay.

According to Shaffer (1995; p. 24), mating takes place in the fall of the year, but eggs are not deposited until the springtime. The eggs may be attached under a cover such as a log or a stone, with the open end of the nest facing away from the current. Perhaps as many as 125 eggs are laid and are individually attached to the underside of the nest. The female keeps watch over them until they hatch in approximately six to eight weeks time. Mudpuppies do not reach maturity until they are about five years old. They feed on a variety of aquatic animals. (Shaffer, 1995).

I was reacquainted with mudpuppies in 2001. That year, there was a significant and apparently widespread die-off of mudpuppies in our area of Lake Erie as evidenced by the numerous dead individuals that washed up on local beaches. I was a biologist for a local health department, and had to respond to a very questionable complaint from the public regarding little "dead alligators" washing up on a local beach. As unlikely as it was, I was compelled to investigate. The "alligators" turned out to be sun dried mudpuppies. The dried remains did indeed remind me of little alligators!

In 2001 this area of Lake Erie also experienced a significant die-off of gulls (pers. obs.) The gulls apparently were dying from a type of botulism. It was thought the gulls ate dead or dying fish (perhaps even mudpuppies) that had been affected by the botulism toxins. Not only did gulls die, but also mudpuppies, and fish species including but not limited to freshwater drum (*Aplodinotus grunniens*), channel catfish (*Ictalurus punctatus*), stonecats (*Noturus flavus*) and even several lake sturgeon (*Acipenser fulvescens*). This sturgeon species is listed as Endangered in Pennsylvania. The die-off of fish and birds; also including gulls, loons and ducks, was attributed to a type E botulism that apparently works its way up the food chain (Obert, E C., Pennsylvania Sea Grant, Tom Ridge Environmen-

tal Center, Erie, Pennsylvania, pers. coms., 2008/2009).

The botulism problem seems quite complex and may be related in part to changes in water quality brought on especially by exotic invasive zebra mussels (*Dreissena polymorpha*). These mussels first showed up in Pennsylvania's Lake Erie waters in 1989.

A couple of years or so later quagga mussels (*Dreissena rostriformis bugensis*) were also well established in our area. These extremely abundant and prolific mussels filter water to obtain food, and by doing so remove many solids from the water. This filtering of the lake water "cleans" the water and allows more sunlight to penetrate. The sunlight, which now better penetrates the water, can help aquatic plants to grow in greater depths. Around 1995 I noted heavy infestation of *Cladophora* (a filamentous algae, which grows attached to rocks etc.) along the lake's bottom in water over nine meters deep. This was noted about six years after the first noted invasion of the mussels in our area. In more recent years the clarity of the lake's water has returned somewhat to a more turbid appearing pre-zebra mussel level (pers. obs.).

When the lake water warms sufficiently, the *Cladophora* dies back and it breaks free from rocks. Some of the *Cladophora* and dead fish are washed to the shore (often around July) to create an extremely foul odor and very "messy/slimy" beach (Figure 1). It may be assumed some of the algae would also settle to the bottom of the lake, and as it decays it may lead to anoxic (no dissolved oxygen) conditions in the water column, particularly near the bottom. The bottom is precisely where mudpuppies live. Fish and likely mudpuppies may be trapped in areas of low oxygen and die. If they die and decay in the lake, this will further lower dissolved oxygen levels, and perpetuate the anoxic condition. Botulism can thrive in oxygen-free environments.

Solid materials filtered through, and later excreted by the invasive mussels are also contributing to the organic loading on the bottom of the lake. When the mussels die their decaying bodies may litter the substrate.

Another rather recently introduced exotic species that I personally suspect may contribute to low oxygen levels on select areas of the lake's bottom are the "spiny water fleas"

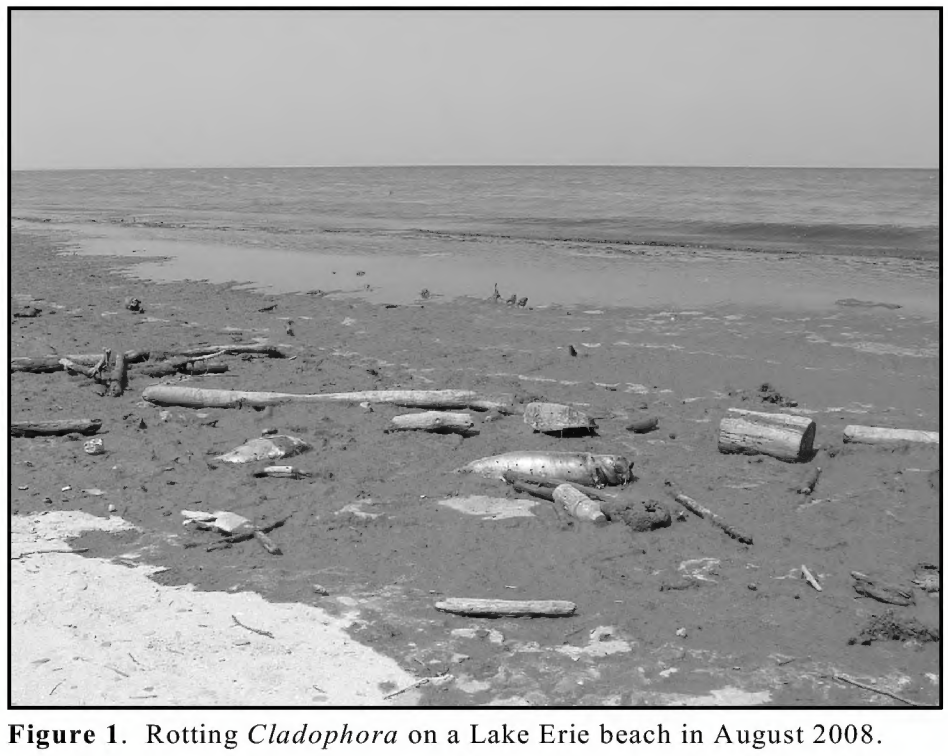

Figure 1. Rotting *Cladophora* on a Lake Erie beach in August 2008.

(*Bythotrephes cederstroemi*). These small creatures (c. 1.0 cm total length, about ½ in) have an exoskeleton and tail about the thickness of a human hair. An individual flea would be difficult to notice, but they can come up on tangled by their long tails on fishing lines, as the lines are trolled through the masses of "fleas." Some of these "gobs" of fleas wrapped around the lines may be the size of grapes, and perhaps consist of dozens if not hundreds of individuals. Their population increases very rapidly during the summer. There are so many individuals they show up like clouds on depth finders. Despite their small size they are so numerous they frequently foul downrigger cables as well as fishing lines. They inhabit offshore areas of Lake Erie. I first observed them while fishing Lake Erie in the early 1980s, but at that time I did not know what they were. I only knew I had never seen them before. They are in the lake by the untold billions (personal opinion, but my wild guess is probably very conservative on the low side). They lay eggs in the fall, and then with the advent of colder water the adults reportedly die. I suspect a "rain" of dead water fleas falls to the bottom of the lake. They almost certainly subsequently decay on the lake's substrate. The flea's eggs eventually hatch and the process continues the next summer. I'm only speculating, but the adult fleas' annual die-off in the colder weather may in some way later affect the low oxygen levels seen in some areas. Intuitively it would seem this annual event would have at least some effect on the dissolved oxygen, and I also suspect it might possibly be related to the botulism problem.

Botulism toxins are very potent, and have been known to kill a variety of animals. I suspect at least some mudpuppies die from ingesting botulism's toxins through the food chain.

Water fleas and zebra mussels are not the only unwelcome "newcomers" to change the lake. An earlier invader, the sea lampreys (*Pertomyzon marinus*) were first noted in Lake Erie around 1921. These parasitic fish apparently invaded Lake Erie by way of the Welland Canal. The canal permitted lampreys and other exotics to get above Niagara Falls, which once acted as a natural barrier. These parasitic fish devastated populations of fish in the upper Great Lakes. They spawn in streams, and the young live in streams for a few years, and then swim down to the lake to become "bloodsucking" predators, and kill large numbers of fish. Attempts to control these lampreys consist of treating the streams with a registered lampricide called TFM (3-trifluormethyl-4-nitrophenol).

TFM is a chemical that is diluted to a predetermined concentration in a stream based on the individual stream's size, flow rate etc. It is fed in a liquid form into select streams in precise doses to kill the young lampreys. The chemical is very effective in killing lampreys, and is reasonably safe as far as other fish are concerned (assuming the concentrations being used are always at recommended levels), *but it can kill mudpuppies*. These salamanders are quite susceptible to elevated levels of TFM. In Erie County we currently have three streams that are periodically treated.

These streams may or may not have in the past served as recruitment areas for lake populations of mudpuppies (or possibly vice versa). I have no information on how many mudpuppies may have been unintentionally killed, but it is just another

concern and a factor that can work against a healthy population of these large salamanders.

Perhaps the biggest "new" threat may be a prolific and voracious invasive species of fish called round gobies (*Neogobius melanostomus***). These fish (assuming they on occasion feed on or attack young mudpuppies) are potentially a very threatening issue regarding the long term survival of the mudpuppy population in our area**. The possible decimation of young of the year mudpuppies by round gobies is a real concern in my opinion. Round gobies are species of fish that might grow to about 15 cm (6 in) or so in length (pers. obs.). I believe they could present a serious threat to this salamander's long term survival. The gobies were first noted in Pennsylvania's Lake Erie waters in 1996 by the Pennsylvania Fish and Boat Commission's personnel (Murray C., Pennsylvania Fish and Boat Commission, Fairview, Pennsylvania, pers. com., 2008/2009).

I wrote a file memo in 1998, while working as a biologist on various water quality issues: "By 1998 gobies were extremely abundant, to the point of interfering with sportfishing from piers, such as the north and south piers where the channel connects to Lake Erie. Gobies steal fishermen's bait virtually as soon as it gets to the bottom of Lake Erie. Three-inch gobies will eat a two-inch minnow. They are extremely voracious. They have a large head, powerful jaw mussels and sharp teeth. . . ." (Wellington, 1998.)

The gobies are found on or near the lake's bottom and they are voracious eaters and will devour not only fish, and zebra mussels, but other things like nightcrawlers (pers. obs.). **Gobies are extremely abundant in this area**, and at times can be such a nuisance that fishermen sometimes quit or move in disgust.

These small fish have powerful jaws. The larger ones can bite quite hard. They will steal bait from hooks with relative ease. I have caught gobies while using spinners with nightcrawlers when I was fishing for walleye. This tells me they are aggressively chasing food and likely could and would catch young mudpuppies. Gobies seem to like rocky areas, and I suspect that they may frequent areas also favored by young mudpuppies.

I have caught gobies while perch fishing east of Erie in the lake in about 14 m of water (about 45 ft). Gobies were very abundant in this area. They are also found in much deeper waters. I have found them in the stomachs of yellow perch; and have caught gobies on hook and line from waters around 18.5 m (60 ft). The deeper water areas are mostly a well compacted muddy-clay type of substrate, and likely have little in the way of stones or cover. Gobies have been found from the shoreline out to waters around 18 m or perhaps even deeper. It only takes a small leap of faith to assume that gobies would make a meal out of baby mudpuppies. I do not know if gobies are significant night feeders. If the gobies are primarily active in the day, any nocturnal foraging by the young mudpuppies might provide them some degree of protection from the ubiquitous gobies. I have caught adult mudpuppies while I was fishing in daylight hours; therefore it would seem likely that the young would at least on occasion move about during the day. If the young mudpuppies are eaten, or even "just" bitten by gobies the ability of mudpuppies to successfully reproduce in adequate numbers will be seriously compromised.

Round gobies, among other things, eat zebra/quagga mussels. These mussels themselves may be concentrating botulism. The gobies after eating the mussels may concentrate the toxins, and they may die. Then they may be eaten by other fish, mudpuppies or water birds like gulls, ducks and birds like loons. Mudpuppies, it seems likely, would eat the contaminated dead fish (including gobies) or other sick fish. They might also pick up the toxins from possibly eating the zebra and/or quagga mussels (dead or perhaps alive?), and themselves become a victim of botulism poisoning. Birds or larger fish might eat the sick or dead mudpuppies and die.

On 10 October 2008, I saw three dead mudpuppies at Freeport Beach. This Lake Erie beach is on the eastern side of Erie County, Pennsylvania, at Twelve Mile Creek's mouth. The three dead mudpuppies that I observed were reasonably fresh, and had not been dead very long based on their appearance (Figure 2). I do not know what the three dead mudpuppies had been eating prior to their deaths, but strongly suspect that botulism poisoning was involved. I suspect many more mudpuppies had died. Probably some were washed up on other beaches; remained sunken, perhaps eaten by larger fish or birds or were buried beneath the sand. On that same October day I did see a large dead catfish on the beach at Freeport, as well as a very sick gull that appeared near death. About a month or so later dead loons were found on Presque Isle State Park and some just west of the Freeport area.

Between 30 October 2008 and 7 November 2008, 106 dead common loons (*Gavia immer*) were found along extensive areas of Pennsylvania's shorelines. At least two of the loons were tested and found to have been positive for botulism (Obert et al., 2008). Loons migrate on their way south through the open waters of Lake Erie area in the fall. Some are thought to eat sick fish contaminated by botulism toxins.

The dead mudpuppies that I observed in early October likely were an early warning that a there would again be some mortality in the migrating loon population.

The exact extent of "damage" to the lake's mudpuppy population due to pockets of low oxygen and/or botulism is not known. Mudpuppies are still locally present, and are caught off piers in the late fall or early winter by anglers fishing for yellow

Figure 2. One of three dead mudpuppies seen by the author at Freeport Beach, Erie County, Pennsylvania, on 10 October 2008.

Figure 3. Mudpuppy caught at night on a hook baited with an emerald shiner.

perch (*Perca flavescens*) and/or burbot (*Lota lota*). These piers are along the deep shipping channel that connects Pennsylvania's Presque Isle Bay with Lake Erie. Burbot are a native fish that look like a codfish. They spend much of their lives in the deeper waters of the lake. They come into relatively shallower waters of the lake in the fall or early winter prior to spawning. This is about the same time that mudpuppies seem to show up. Mudpuppies are frequently caught with hook and line on our native emerald shiners (*Notropis atherinoides*). These shiners are a commonly used baitfish. They are usually fished on or near the bottom of the lake. Mudpuppies seem very fond of these native shiners (Figure 3). I have personally caught mudpuppies from this area. The mudpuppies are often caught in the channel area in waters ranging in depth from perhaps 4 to 10 m, and many are caught after dark.

The Pennsylvania Fish Commission, which is now called the Pennsylvania Fish and Boat Commission, had been doing assessment trawling in the lake for many years. An objective of the trawling is to compare fish populations from year to year, and to monitor trends and species abundance. The primary purpose of the trawling is to monitor fish populations, and mudpuppies are not a targeted species. Mudpuppies are noted only as an incidental catch. Trawling usually is conducted in predetermined stations in the deeper open waters of the lake where the bottom is rather smooth and covered with fine compacted sediment. The sampled trawling areas are generally relatively free from large rocks and ledges that would tear up the trawl nets. It is probable, in my opinion; many mudpuppies (perhaps most) live in areas not routinely sampled by trawling. On 16 November 1987, according to archived data I obtained from the Pennsylvania Fish and Boat Commission (Murray C.) during one trawl 30 individual mudpuppies were caught. The area was in Lake Erie east from the city of Erie in 64 ft of water, and is off Twelve Mile Creek (off the area where I found the three dead mudpuppies). This trawl catch of mudpuppies was exceptional, and has not been repeated in 20 years since that date.

I am speculating that on that November day in 1988, the mudpuppies were probably staging for spawning purposes or perhaps migrating towards a spawning area. Since then an occasional mudpuppy or so has been captured in the Fish and Boat Commission's trawls over the years, but in very low numbers (Murray C.). Over about the past 20 years, most of the trawls caught no mudpuppies at all.

It should be noted that that "big catch" was made in 1988, prior to the first noted presence of the introduced zebra mussels in 1989, and the round gobies noted in our area in 1996. In 2008, although trawling was limited due to manpower shortages, no mudpuppies were captured in trawls by the Pennsylvania Fish and Boat Commission. (Murray C.).

The Pennsylvania Fish and Boat Commission in its current 2009 summary book of fishing regulations has listed the mudpuppy as Protected and **people are not permitted to possess any**!

It can be seen there is a lot of potential to do research on this species in our area of Lake Erie. So many "variables" (especially invasive species) are showing up it is difficult to know what the interactions are, or what the next problem(s) may be.

I will not attempt to speculate in detail on the many chemical compounds introduced by humans that probably do not enhance the mudpuppy's life expectancy and/or reproductive ability. Suffice it to say that domestic and industrial wastes have not always been kind to our fish and wildlife. I would be surprised if at least some chemicals that we disposed into the water (and perhaps still are doing so) have a deleterious affect on mudpuppies.

Obviously much good research needs to be conducted, and appropriate measures taken to protect this rather unique salamander.

Sport fishing, with its incidental catch of mudpuppies is unfortunate, but its impact on the total population of these salamanders in the writer's opinion is rather insignificant compared to the other potentially more serious issues noted above. However; fishermen and women can and must help protect this special creature.

I expect the next time I see some stranger catch a mudpuppy I may say: "Wow! You caught a mudpuppy. How lucky you are! They are a native and protected species. Try to get it back in the water unhurt as soon as you can!"

Acknowledgment

Special thanks to Brian S. Gray [Serpent's Cast Identification Services, 1217 Clifton Drive, Erie, Pa. 16505] for his encouragement and review of this document.

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Bull. Chicago Herp. Soc. 44(3):42-43, 2009

Note on Reproduction of the Sonoran Spiny-tailed Iguana, *Ctenosaura macrolopha* (Squamata: Iguanidae)

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Abstract

Gonadal material of the Sonoran Spiny-tailed Iguana, *Ctenosaura macrolopha* from Sonora and Sinaloa, Mexico was histologically examined. Minimum sizes for reproductive activity in males and females are provided. Males follow a seasonal testicular cycle in which sperm production occurs in early spring. My finding of a female with 12 enlarged ovarian follicles (> 8 mm) is a new maximum clutch record for *C. macrolopha*.

The Sonoran spiny-tailed iguana, *Ctenosaura macrolopha* (*sensu* Smith, 1972) is known from southern Sonora, southwestern Chihuahua and northern Sinaloa, Mexico (Lemos-Espinal and Smith, 2007). Sheetz et al. (2007) reported on two *C. macrolopha* clutches from Chihuahua, Mexico. The purpose of this note is to provide information on its reproductive cycle from a histological analysis of *C. macrolopha* museum specimens. The first information on the *C. macrolopha* testicular cycle is presented. Comparisons are made with reproduction in congeneric species.

A sample of 34 *Ctenosaura macrolopha*: 18 males (mean snout–vent length [SVL] = 169.8 mm ± 29.1 SD, range = 112–212 mm), 15 females (SVL = 152.5 mm ± 22.9 SD, range = 124–200 mm) and one presumed neonate (SVL = 55 mm) from Sinaloa (n = 8) and Sonora, Mexico (n = 26) were examined from the herpetology collection of the Natural History Museum of Los Angeles County (LACM), Los Angeles, California. *Ctenosaura macrolopha* were collected 1957–1977.

The left testis, epididymis and left ovary were removed from males and females, respectively. Gonads were embedded in paraffin, sectioned at 5 µm, and stained with Harris' hematoxylin followed by eosin counterstain (Presnell and Schreibman, 1997). All enlarged follicles (> 8 mm length) were counted, but no histology was performed on them. Male and female mean body sizes were compared with an unpaired *t*-test using Instat (vers. 3.0b, Graphpad Software, San Diego, CA). Histology slides were deposited in LACM. The following *C. macrolopha* were examined: MEXICO, Sinaloa (LACM): 25703, 28705-28708, 94824, 94825, 94828; Sonora (LACM): 6587, 6588, 25179, 59821, 59822, 74299, 75057, 75348, 75349, 94830-94832, 94834, 94835, 94837, 94842-94850, 94852, 126584.

The testicular cycle was divided into three stages: (1) regression in which seminiferous tubules contain mainly spermatogonia and Sertoli cells. The germinal epithelium is reduced to one or two cell layers, (2) recrudescence, there is a proliferation of germ cells as recovery for the next period of sperm production (spermiogenesis) is underway. In early recrudescence, primary spermatocytes are the most abundant cell, some are dividing. In late recrudescence, secondary spermatocytes and spermatids predominate; (3) spermiogenesis, seminiferous tubules are lined by clusters of spermatozoa and/or rows of metamorphosing spermatids. The epididymides contain sperm.

There was no significant difference between male and female mean body sizes (unpaired *t*-test, $t = 1.87$, $df = 31$, $P = 0.071$). Monthly changes in the testicular cycle are shown in Table 1. Males undergoing spermiogenesis were collected from March to May; those with regressed testes were from June to August. One male from July contained a testis that was in early recrudescence with occasional spermatogonial divisions. The smallest reproductively active *C. macrolopha* male (spermiogenesis in progress) measured 128 mm SVL (LACM 74299) and was collected in May. The testicular cycle of *C. macrolopha* is similar to that of the anguid lizards, *Elgaria multicarinata* (as *Gerrhonotus multicarinatus*) (Goldberg, 1972) and *E. coerulea* (as *Gerrhonotus coeruleus principis*) (Vitt, 1973) as spermiogenesis (= sperm formation) occurred in early spring and was concluded by early June.

Monthly stages in the ovarian cycle are in Table 2. Only two stages were present: (1) quiescent (= no yolk deposition) and (2) enlarged follicles (> 8 mm) prior to ovulation. Two other stages typical of reptile ovarian cycles: early vitellogenesis (= yolk deposition) and oviductal eggs were not present. This is likely a result of my small sample sizes.

My report of one female with 12 enlarged follicles (> 8 mm

Table 1. Monthly stages in the testicular cycle of *Ctenosaura macrolopha* from Sonora and Sinaloa, Mexico.

Month	*n*	Recrudescence	Spermiogenesis	Regression
March	3	0	3	0
April	4	0	4	0
May	1	0	1	0
June	1	0	0	1
July	6	1	0	5
August	3	0	0	3

Table 2. Monthly stages in the ovarian cycle of *Ctenosaura macrolopha* from Sinaloa and Sonora, Mexico.

Month	*n*	Quiescent	Enlarged follicles (> 8 mm)
April	2	1	1
June	4	4	0
July	6	6	0
August	2	2	0
September	1	1	0

length) (LACM 6587) is a new maximum clutch size for *C. macrolopha.* It was the smallest reproductively active female in my study and measured 149 mm SVL (LACM 6587). Females from Chihuahua were mature at 87 and 89 mm SVL (Sheetz et al., 2007). A presumed neonate *C. macrolopha* (SVL = 55 mm) (LACM 94845) was collected on 24 August in Sonora.

Ctenosaura typically have a short breeding season in the drier part of the year (Fitch, 1970). One yearly egg clutch appears typical. The reproductive cycle of *C. macrolopha* appears similar to that of other congereric species. In male *C. macrolopha* sperm production occurs in the spring as it does in other species of *Ctenosaura* (Casas-Andreu and Valenzuela-López, 1984; Goldberg and Beaman, 2005). *Ctenosaura acanthura* females from Veracruz, Mexico, were gravid in April (Smith and Burger, 1950). *Ctenosaura pectinata* from Jalisco and Guerrero (Casas-Andreu and Valenzuela-López,1984; Uribe et al., 1988), from Morelos (Evans, 1951), and Chiapas (Alvarez del Toro, 1982) were gravid in the spring. Asplund (1967) reported *C. hemilopha* reproduction occurred before late summer; Goldberg and Beaman (2005) reported females produce eggs in the spring in the Cape region of Baja California. In Central America, ovulation in *Ctenosaura similis* may occur as early as February (Fitch and Henderson, 1978). There is apparent geographic variation in reproduction in *C. macrolopha* as females from Chihuahua, Mexico, contained enlarged follicles in July (Sheetz et al., 2007) whereas those from Sinaloa and Sonora (Table 2) were not reproductively active in summer.

Acknowledgments

I thank Christine Thacker (LACM) for permission to examine *C. macrolopha.*

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Bull. Chicago Herp. Soc. 44(3):44, 2009

Breaking the Rules: Unusual Feeding Patterns in Healthy, Captive Born and Raised Common Boa Constrictors (*Boa constrictor*)

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After working with hundreds of captive common Colombian boa constrictors (*Boa constrictor*) over thirty years, and authoring a book on the subject (*Captive Husbandry and Propagation of the Boa Constrictors and Related Boas*), I believed I could not be surprised by their approach to feeding. My experience includes maintaining numerous adults, some of which were in my care for more than 20 years, as well as raising neonate boa constrictors, and producing young in my facility. Through all the boas, one constant remained; when properly maintained, I never encountered a common boa constrictor that was not an aggressive feeder. That changed in January 2007.

Late 2006, a friend who accidentally produced a litter of common Colombian boas in 1997 contacted me. A friend of his, who acquired a pair of the boas as neonates, and had been raising them, developed health issues that prevented him from caring for the now six-foot snakes. I was asked to adopt the boa pair. I had an empty 6-foot Neodesha, and a 4-foot fiberglass enclosure, but really didn't need a pair of good-size boas, of which I did not know the sex, and even if a sexual pair, had no intention of reproducing. After speaking with the owner of the boas, and feeling his dedication to the snakes, I reluctantly accepted. January 6, 2007, the boas were delivered, and were in fine shape. Upon inspection, it was obvious this was a sexual pair. Typically, to better understand the individual snakes, I would have inquired as to the owner's husbandry and feeding practices, but after all, these were fine looking captive born and raised common Colombian boa constrictors.

Although (with the exception of breeding attempts) I maintain only one snake per enclosure, I was asked to keep the boas together, as this is how they had spent their entire lives of nearly 10 years. Multiple snakes, especially large specimens maintained within the same enclosure can become problematic during feeding, with more than one snake pursuing the same food item. Additionally, if a snake becomes ill, others within the enclosure, drinking from the same water container have an increased chance of contracting disease. Despite my reservations, I placed the boa pair in the Neodesha enclosure. Admittedly, it may a bit of anthropomorphism on my part, but the two boas do very much seem to enjoy the others' company, and rarely are they not physically contacting each other, and positioned as mirror images. The snakes are maintained in ideal conditions: room ambient temperature 80°F; 80% relative humidity; a large hot spot produced by a heating pad under one end of the enclosure, a large water tub which can be entered; and a 12 hour light/12 hour dark photoperiod.

As the snakes were captive born and raised, after a day of acclimation I offered each a jumbo pre-killed rat. The female showed no interest. However, the male aggressively struck and constricted the first rat, and after ingestion, the second, which was intended for the female. Two rats was a larger meal than I would typically offer a boa of his size, but although it caused some bloating during the digestive process, the meal was completely digested, and properly passed.

The female has proven to be a finicky eater. Often, she shows no interest in food, which can last several months. She never strikes at, or constricts a food item, but only eats when a freshly killed rat is left in the enclosure. Typically, if the rat is eaten, a day or more will pass prior to it being ingested.

The male is an even more interesting story: after his initial feeding of 7 January 7 2006, he refused all food for 18 months. If a freshly killed rat was offered near his head, in the manner which previously enticed him to feed, he instantly recoiled, or struck defensively, with no intention of feeding. If left in the enclosure, the rat was ignored. For no explainable reason, after an 18-month fast, on 6 July 2008, he once again aggressively stuck/grasped, constricted and ingested a freshly killed jumbo rat—basically identical to the many that had been ignored.

The male boa was received with excellent weight, but by no means overfed. He has displayed no evidence of health issues, or weakness. In fact, within days of receiving the pair, copulation was observed, and regularly initiated for several consecutive days. During his 18-month fast, he lost a noticeable amount of weight, but was nowhere near emaciated, and appeared typical of a common boa in the wild. The latest meal was digested without incident, and with the exception of his disinterest in feeding, his behavior is completely normal. Although several meals were refused, an additional jumbo rat was consumed on 12 November 2008, and a large rat on 2 December 2008. To further break "the rules," the latest meal was consumed during a period of on-and-off breeding, and while the male was "in shed."

A few decades ago, when captive produced reptiles were not nearly as prevalent as today, I worked with wild-caught specimens. I maintained an adult California mountain kingsnake (*Lampropeltis zonata*) which I slowly converted from feeding on anoles to pink mice by scenting the pinkies with anole entrails. An adult mangrove snake (*Boiga dendrophila*) was also converted from skinks to mice. But never did a common Colombian boa in my care refuse a meal, as has been experienced with both of these specimens. Even my gravid females continued to feed throughout their gestation period.

Even with the male's minimal food intake, late November/early December, he was observed pursuing and copulating with the female. The female continues to refuse most offerings. The male will only feed on moving rats, and the female exclusively on non-moving, dead rats. With no notable husbandry changes of any type, for the past two months, the male boa has aggressively consumed every rat offered. This is at least one per week. As well as increasing in overall size, his weight has returned to, or surpassed that of his pre-fast.

Bull. Chicago Herp. Soc. 44(3):45, 2009

The Everglades Python: More Fun Than Disney World

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For several years my family and I had been intending to look for Burmese pythons in the Florida Everglades. This invasive species is well established there. The pythons are nevertheless protected from collection within the boundaries of the Everglades National Park. However, outside of the park there are more and more sightings of these animals, both large and small.

In January of 2008 my son Greg, my wife Milvi and I left Sanibel Island on Florida's west coast, where we had been staying for the holidays, and drove east on the Tamiami Trail (Route 41) towards the national park to search in earnest for *Python molurus bivittatus*, the Burmese python.

We reached our destination late in the afternoon and drove many small roads well into the night. But warm as it seemed to us, it was still the winter season here and the evening was cool. We found one DOR *Crotalus adamanteus* and that was all.

Fast forward six months later to June 2008. . . .

Another of our sons, Donald, flew into Miami equipped with satellite photo maps of the Everglades. Milvi and I picked him up in the afternoon and we cruised many small, obscure roads in the area around the national park. Again we came up empty handed.

This time on our three-hour drive back to Sanibel we were seeing several species of snakes DOR—a sure sign there was a good chance of finding pythons on the move.

We spent the next couple of days finding cornsnakes, yellow ratsnakes and watersnakes, but no pythons. On our last afternoon before or son Don had to fly back to Chicago, we spoke with Bill Love and he gave us some locations we hadn't been to. This would be our last chance.

At dusk on a small road that led to nowhere there it was. Our python, stretched out along the edge of the road.

I stepped on the brakes. Don was out of the car in an instant and grabbed the last three feet of the snake as it moved into the undergrowth. Immediately the snake turned and came at him about waist high with its mouth wide open. As soon as he let go, it headed back into the brush. He grabbed it again, and again the snake turned and rushed at him.

Don and the snake repeated the grab and attack scenario a couple more times. By this time I, despite being much slower these days, was close enough to try and help him. After driving hundreds of miles and searching for days, I didn't want to lose this snake.

The next time it came back at Donald I stepped in front of the snake's strike. It got me on my left thigh about crotch level. It was caught on my pants just long enough for me to grab it behind the head, and Donald took control of the coils that were now thrashing about. Wild pythons are not at all like tame pythons This was a very frightened and unhappy snake.

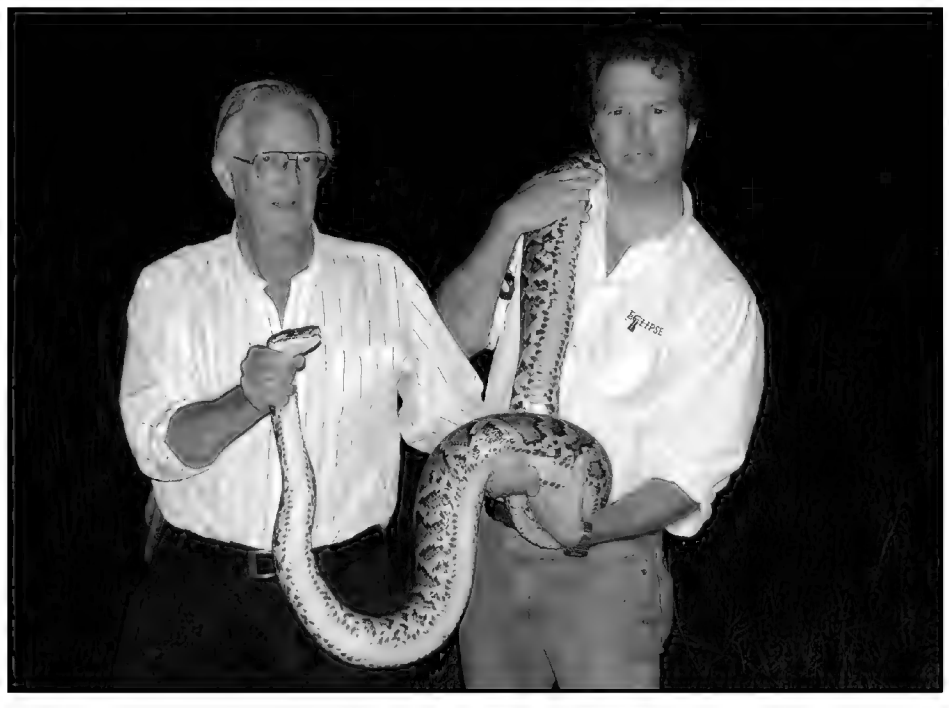
Milvi was taking pictures of all this fun. She quietly informed us we were pretty stinky now from snake poop and musk. In our excitement we hadn't noticed.

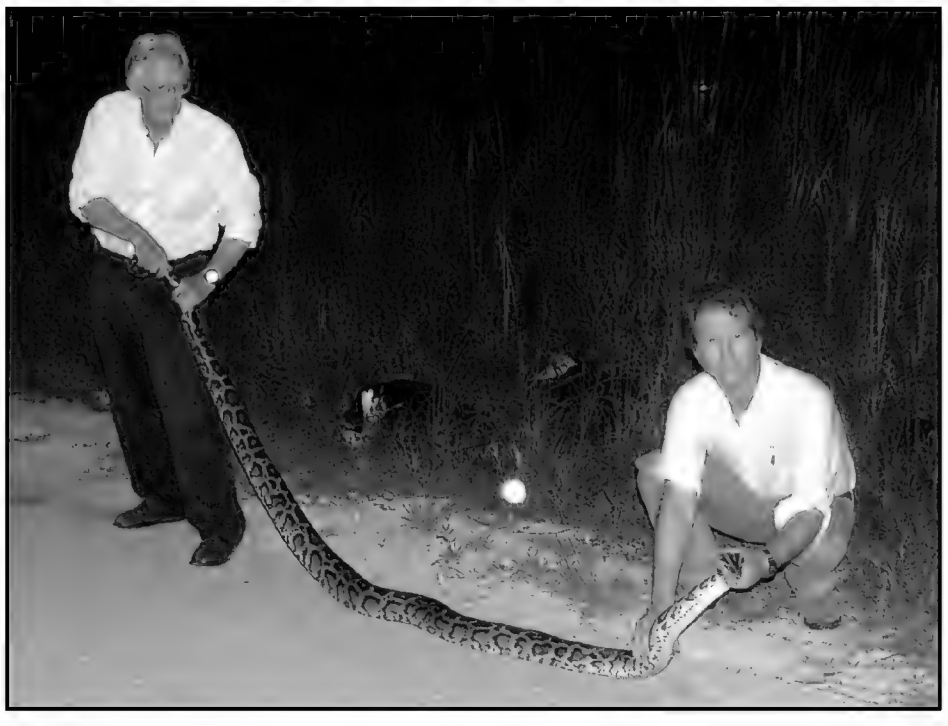
The snake was a beautiful Burmese python about ten or twelve feet long, very strong and eager to bite, but slimmer than most captive pythons of this length.

We enjoyed the moment, handled the snake as it calmed down a bit, and discussed what we should do now that we had it. We have both kept several species of large pythons in the past, and although we wanted to catch one we didn't necessarily want to keep one.

We had the great pleasure of the hunt and the excitement of the capture and that was what we came for. Reluctantly we made the decision to release the snake, and watched as it flowed back into the Everglades.

I realize that there are those who will frown on this action. My only response can be that the excitement and my feelings for the snake clouded my judgment that day. I now feel a better solution could have been found. But I still like to think of "our" python out there somewhere being a python.





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What You Missed at the February CHS Meeting

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When a group of us from the CHS visited the Toledo Zoo last August, I was standing in the new amphibian exhibit listening to Tim Herman tell us about the little critters that filled the room we were looking into. That room, because of the needed isolation, was about the only room in the zoo with reptiles and amphibians that we couldn't enter. I listened to Tim explain why the room and the isolation were important and I thought (I do every once in awhile) we needed him to speak to the society about these little animals. The exhibit was crowded with people and kids, the noise was loud, and with my hearing I was having trouble understanding much of what Tim was saying, but I knew that the story was cool and Tim was delivering it with panache. Shortly after we returned, Jason Hood contacted Tim, and in spite of getting married shortly, finishing his master's paper on the four-toed salamander (*Hemidactylium scutatum*), and writing an account for a new Ohio herp book, Tim said he'd be honored to talk to the Chicago Herpetological Society.

Tim Herman is a native Illinoisan, having grown up in Peoria. From 1994 until 1999 he volunteered at the Glen Oak Zoo, working with Doug Holmes. He graduated with a B.S. in Biology from the University of Illinois in 2001, worked that summer with Chris Phillips doing fieldwork for the Illinois Natural History Survey, and started at the Toledo Zoo in December of that year, where he has worked until the present in the herpetology department. He has worked in Panama and Africa and is currently an instructor for the Association of Zoos and Aquariums' Amphibian Biology, Conservation, and Captive Management Course. He arrived at the meeting with his bride Maria and his brother Chris. His talk was titled "Found and Lost: Discovery, Extirpation and (Hopefully) Reintroduction of the Kihansi Spray Toad." The story of this animal should be a book. Tim captured the complexities, intrigue and adventure that surround the little toads inside that biosecure room. His talk had something for every interest, including scientific sleuthing, adventurous fieldwork, and intricate captive breeding. He delivered all this with a terrific sense of humor. His first slide had a picture of a Kihansi spray toad sitting on a finger. Tim explained that the finger belonged to him, the photograph had been used in many publications, and therefore the finger was famous. He humbly stated that anyone who had shaken his hand that evening had touched that famous finger.

Tim Herman's world famous finger. Oh yeah, there's a Kihansi spray toad there too.

The Kihansi River Gorge is located in south-central Tanzania on the edge of the Eastern Arc mountains. In two main falls and several smaller falls the Kihansi River plunges off the escarpment dropping 130 m (427 ft). The falls dramatically affect the climate in the gorge, creating constant mist and spray, lowered temperature and strong gusty winds. The gorge is an island of moist habitat surrounded by relatively dry forest. Because of the unique environment, it contains endemic plants and animals that have some of the smallest natural ranges in the world. The Kihansi spray toad (*Nectophrynoides asperginis*) is one. Tim showed us pictures of the gorge and the habitat that looked like a set from *The Lost World*. He even had video that conveyed the mist and high winds. Tim gave us a herper's travelog of Kihansi and Tanzania, including pictures of a "rocket frog," a little three-inch frog (*Ptychadena* sp.) with hind legs nearly as big as its body that can leap eight feet, an African bullfrog (*Pyxicephalus adspersus*), a banded rubber frog (*Phrynomantis bifasciatus*) with pictures of its crystal clear tadpoles, pygmy chameleons (*Rhampholeon brevicaudatus*), which Tim says always look as if they're a little disappointed in you. And, knowing his audience, he included a few invertebrates, the coolest being a stalk-eyed fly (family Diopsidae), a fly with its eyes on long stalks that the males match up for dominance. He also gave us an overview of the genus *Nectophrynoides*, found only in the Eastern Arc mountains with a wide variety of frogs, all of which are CITES Appendix I listed.

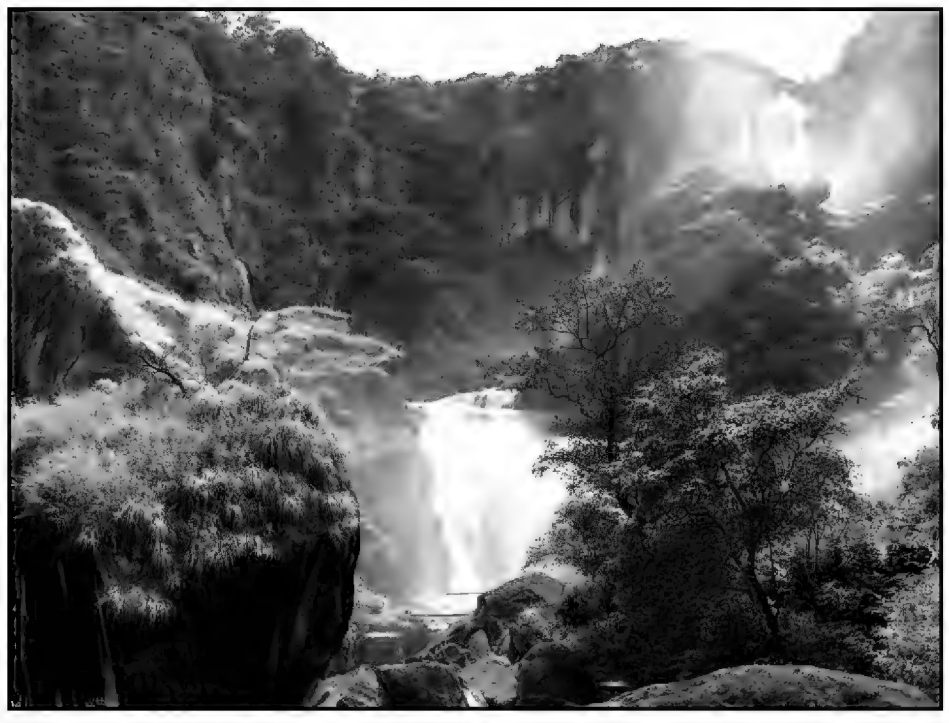
In the 1980s the Tanzanian government, with the help of the World Bank, looked into damming the Kihansi River above the falls. Most of you probably mentally cringed when you read that sentence, but this dam was to have a tiny ecological footprint of about 20 hectares (50 acres). It's nice to know that such projects are beginning to take the environment into consideration. Tim showed a picture of a small boat on a very small lake. This small footprint was accomplished by running water from the base of the dam through a six-kilometer (3.7-mile) tunnel to an underground power station. The tunnel bypassed the falls. Construction began in 1993 and was going along fine until the World Bank demanded an additional environmental survey in 1996. That survey—the second—discovered the Kihansi spray toad at the base of the falls. The gorge contains some of the most unique habitat in the world, with grass and moss-like plants growing in the constant spray and larger plants totally inhibited by the deep gooey mud substrate and high winds. Tim called it a spray wetland. It was very difficult to access the gorge, which was probably the reason that the frog was not discovered on the first survey. Occu-

A stalk-eyed fly (family Diopsidae).

A look into one of the Toledo Zoo's biosecure rooms where the Kihansi spray toad population is increasing. The sign says, "One of the only places you can see a Kihnasi Spray Toad is—right here." The zoo is justly proud of the work they've done on the toad.

Love is in the air. These frogs are a little less than an inch long.

Tim Herman transferring the Toledo Zoo's spray toads to the new biosecure rooms. He joked that he had half of the world's entire population of one species in that trash bag.



The Kihansi River Gorge in 2007. This is after the dam has reduced the flow of the river!

Many of the amphibians sold commercially in the U.S. are exported from Tanzania. This is a banded rubber frog, *Phrynomantis bifasciatus*.

On the left is a view of a portion of the Kihansi Falls, October 1998, pre-dam. On the right is the same view, October 2001, post-dam.

pying a range of less than .02 km^2 (5 acres) and with a maximum size of 2 cm (3/4 inch), the little toad soon became a giant wrench in the dam machinations.

European sponsors of the project began pulling out of the project as soon as they realized the risk to an endemic species with such a limited range, but the World Bank was committed and Tanzania wanted the dam. It was completed in 2000 and the flow rate over the falls was to be kept at about five percent of the pre-dam flow. Unfortunately, the Tanzanian government has not adhered to that agreement and less than four percent is now the norm. This power generating facility provides up to 30% of the country's electricity. For about nine months after the dam first began operating, the gorge was virtually dry because of the reduced flow. The toads were crowded into the very small areas still receiving some spray. Tim showed dramatic pictures of the falls in October 1998 before the dam and three years later after the dam. A raging torrent had become a comparative trickle. When project scientists discovered the despoiled spray wetlands in 2000, remedial measures were begun to save the habitat and the toad. Pipelines were installed to spray what were deemed the most critical areas. After solving problems such as silt build up and plant scouring, by 2003 the toad population was equal to pre-dam numbers. The habitat was still not back to its original condition but the Kihansi spray toad seemed to have recovered and the dam was producing electricity. Then, from 2003 to 2004, populations of not only the spray toads, but also every other amphibian in the gorge plummeted. The last spray toad seen in the wild was in 2005.

Fortunately in the fall of 2000, the World Bank financed captive breeding efforts. Four-hundred-ninety-nine Kihansi spray toads were shipped to the Bronx Zoo and 230 of those were immediately sent on to the Detroit Zoo. About half of the toads died in the subsequent weeks due to parasitic lungworms, but with medication and husbandry changes the animals began breeding and the population rebounded. In 2002 toads were shipped to other zoos, including the Toledo Zoo, which received 24. Initial husbandry problems resulted in losses, but Tim and the folks at the zoo are resourceful and inventive. Changes in the water being sprayed, the supplements being given, the substrate of the cages and the lighting all led to the first seven births in 2003.

The population now stands at 1200 frogs at the Toledo Zoo. Tim had pictures of the biosecure rooms that the zoo has constructed to house the toads. The Toledo Zoo is probably the only place on earth where the average person can view these animals. Tim had lots of pictures of the Kihansi spray toads and toadlets, which are about the size of a peppercorn. Cute always plays well, and the CHS audience is no exception as aaahs and ooohs filled the room.

I would like to write that the Kihansi spray toad now has easy sailing in captivity until some can be reestablished in the wild, but their destiny is still uncertain. Populations in other zoos have fluctuated wildly, including the Bronx Zoo in 2004, which went from several hundred to 30 in just a few months. The Bronx Zoo recalled the toads from the other zoos except the Toledo Zoo. From a low of 50 altogether in captivity, the toads now number 1200 at the Toledo Zoo and 300 at the Bronx Zoo. Challenges and threats still remain before the toads can be returned to the wild. When they are reintroduced it will be with great care. With the cooperation of the University of Dar es Salaam, a captive population will be established in Tanzania. The U.S. experiences will guide the design of the facilities and the training of staff. Animals returned to Tanzania will have complete histopathologies and genetic evaluations of any parasites. Sentinel animals that were sympatric with the toads will be used to insure that the captive born toads don't exchange diseases with the wild animals. With funding from the World Bank, the little Kihansi spray toad may once again sing its ultrasonic call in the mists of Kihansi Gorge. Dedicated individuals such as Tim Herman are doing what they can to make that happen. Tim figures that at the current rate of reproduction, the Toledo Zoo's population will grow to seven-and-a-half million by the year 2019. He's joking, of course, but wouldn't it be nice if these toads became common enough to be used as food for captive hog-nosed snakes? Just joking! Jeesh.

Answers to Herp-Acrostic #19

The quotation was taken from page 13 of *Frog Search* by M[artin] Pickersgill:
"Scientific writing is traditionally the domain of stuffy and pompous language, of the lecturing voice of authority, all seemingly designed to create an air of infallibility and distance all but the select readers from the writer. It's contagious, and before you know it, you're doing it yourself.."

A. Malformed
B. Peringuey
C. Islands and the Sea
D. Cottonmouth water moccasin
E. Kidney bean
F. Eurydice
G. Rainbow
H. Snot otter
I. Gorgon
J. Intensify
K. Life with Ionides
L. Linguatulids
M. Flapfoot
N. Rift Valley
O. Our Lady of the Iguanas
P. Graciela Iturbide
Q. Surface feeding
R. Ecotourist
S. Affinity
T. Rettili
U. Collett
V. Histology

Herpetology 2009

In this column the editorial staff presents short abstracts of herpetological articles we have found of interest. This is not an attempt to summarize all of the research papers being published; it is an attempt to increase the reader's awareness of what herpetologists have been doing and publishing. The editor assumes full responsibility for any errors or misleading statements.

ECOLOGY OF A CAMBODIAN SNAKE ASSEMBLAGE

S. E. Brooks et al. [2009, Copeia 2009(1):7-20] studied the reproductive and trophic ecology of a group of aquatic and semi-aquatic snakes that face severe hunting pressure in Cambodia. Over a 2-year period the authors sampled hunters' catches, measuring and dissecting a total of 8982 specimens of seven snake species, five of which belong to the family Homalopsidae. The seven species—*Enhydris enhydris*, *Enhydris longicauda*, *Homalopsis buccata*, *Enhydris bocourti*, *Erpeton tentaculatus*, *Xenochrophis piscator* and *Cylindrophis ruffus*—all inhabit Tonle Sap, the largest lake in Southeast Asia. All species are sexually dimorphic in either body size or tail length. The larger species, *E. bocourti* and *H. buccata*, have a larger size at maturity, and the non-homalopsids, *X. piscator* and *C. ruffus*, have the highest and lowest fecundities, respectively. Clutch size increases significantly with female body size in all species, and with body condition in *E. enhydris*. The data also suggest that relative investment in reproduction increases with size in *E. enhydris*, which has the largest sample size. All species except one are synchronized in their timing of reproduction with the seasonally receding floodwaters of the lake. There was variation in both frequency of feeding and prey size and type among species, with the homalopsids more similar to one another than to the other non-homalopsid species. The prey to predator mass ratio ranged from 0.04 to 0.1 in the homalopsids, compared to 0.15 to 0.17 in the non-homalopsids. There was also variation in the feeding frequency between the sexes that differed between species and six species continued to feed while gravid. These detailed life history analyses can help provide a basis for assessing conservation options for these heavily exploited species.

HERPETOFAUNA OF THE ISLAND OF RHODES

T. Bader et al. [2009, Herpetozoa 21(3/4):147-169] summarized the knowledge about the herpetofauna of Rhodes and prepared a new species list based on several recent herpetological surveys, as well as data from the literature and the collection of the Natural History Museum in Vienna. The following species were regularly encountered: *Bufo viridis*, *Hyla arborea*, *Pelophylax cerigensis*, *Mauremys rivulata*, *Hemidactylus turcicus*, *Laudakia stellio*, *Ophisops elegans*, *Lacerta trilineata*, *Anatolacerta oertzeni*, *Ablepharus kitaibelii*, *Chalcides ocellatus*, *Trachylepis aurata*, *Blanus strauchi*, *Typhlops vermicularis*, *Dolichophis* sp., *Platyceps najadum*, *Hemorrhois nummifer*, *Zamenis situla*, *Natrix natrix* and *Telescopus fallax*. The taxonomic status of the occurring whip snakes is discussed. *Mediodactylus kotschyi* has been added to the island fauna because of some records in the south part of the island. The occurrence of *Testudo graeca*, *Pseudopus apodus* and *Natrix tessellata* is questioned because their mention in older literature remained unconfirmed. Recent single records of *Chamaeleo chamaeleon*, *Malpolon monspessulanus*, *Testudo graeca* and *T. hermanni* are listed and their status is discussed.

POND TURTLES AT VANDENBERG AFB

D. J. Germano and G. B. Rathbun [2008, Chelonian Conservation and Biology 7(2):188-194] studied the population structure and growth of western pond turtles (*Actinemys marmorata*) at Vandenberg Air Force Base along the coast of central California in April 1995 and June 1996. In all, 179 individuals (115 males, 27 females) were captured from 7 ponds during 26 days of trapping. Many turtles were adult-sized, but based on scute annuli, 74% were < 10 years of age, including many 2- to 3-year-olds. This population structure likely was due to a relatively fast growth rate, especially compared with closely related aquatic turtles in eastern North America. Mean clutch size was 5.2, but 66.7% of females were gravid, and one female produced two clutches. These reproductive data are similar to those reported for other populations in the southern portion of the species' range. Females reached reproductive maturity as early as 4 years of age. The relatively mild temperatures of California's Mediterranean climate, especially when compared to the seasonal extremes in more continental and northern regions of North America, may explain the different growth rates and population characteristics of freshwater turtles from these two regions of North America.

TERRESTRIAL ACTIVITY OF EASTERN MUD TURTLES

L. A. Harden et al. [2009, Copeia 2009(1):78-84] note that in urbanized landscapes, golf course ponds may provide the only remaining habitat for semi-aquatic animals. Eastern mud turtles (*Kinosternon subrubrum*), which rely heavily on both aquatic and terrestrial habitats, may face challenges on golf courses, which typically have significantly modified and fragmented landscapes. The authors conducted a radio-telemetric study of 11 mud turtles inhabiting a golf course pond in the western Piedmont of North Carolina to investigate their terrestrial activity and habitat selection in a fragmented landscape. Most turtles moved to terrestrial habitats in late summer and emigrated a mean distance (± SE) of 187.2 ± 67.4 m and moved a mean straight line distance (± SE) of 119.3 ± 47.4 m from the pond. Habitat selection was determined using logistic regression to compare turtle locations with random locations. Mud turtles selected forested habitats with moderate canopy cover and no grass. Mud turtles also selected habitat containing herbaceous vegetation and woody debris as overwintering locations. Mud turtles did not select heavily disturbed habitats with limited canopy cover and pavement or cut grass associated with fairways, roughs, and residential lawns. Overall, this study suggests that maintaining relatively undisturbed forested habitat within fragmented urban landscapes, such as those found on golf courses, may allow for the persistence of these semi-aquatic turtles. Information from this study can be used to better understand critical upland habitat requirements of other semi-aquatic species inhabiting fragmented landscapes and aid in the implementation of habitat management plans.

DIET OF THE SPUR-THIGHED TORTOISE

R. Rouag et al. [2008, African Journal of Herpetology 57(2): 103-113] studied the diet of an Algerian population of spur-thighed tortoise (*Testudo graeca*) with the aims of exploring: (i) the variation in diet among males, females and juveniles, (ii) the relationships between consumption and relative availability of the plant species, and (iii) which plant tissues, vegetative or reproductive, are eaten by tortoises. More than forty plant species were recorded at the study area, with monocot species (n = 7) having a greater percent cover than that of dicot species (n = 31 species) or Gymnospermae (n = 2). Tortoise diet was studied by categorizing 4422 plant and animal fragments in fecal pellets of 20 males, 16 females and eight juveniles. Tortoises ate a wide variety of plant species, including 13 dicots and three monocots, and occasionally invertebrates. The number of fragments for a plant species was correlated with plant species cover, and plant vegetative tissues exceeded plant reproductive tissues in the feces. Dicots (Fabaceae, Composeae, Primulaceae and Caryophyllaceae) accounted for over 70% of the diet (fecal fragments). The high dietary (niche) overlap, and null model analysis (RA3 algorithm with 30,000 Monte Carlo simulations), indicate that males, females and juveniles did not partition food resources; all three groups ate the same plant species.

EYELASH VIPER PREDATION ACTIVITY

G. G. Sorrell [2009, Copeia 2009(1):105-109] notes that the eyelash palm-pitviper, *Bothriechis schlegelii*, has been reported to be a nocturnal ambush predator that preys upon a wide variety of vertebrates. This study demonstrates that *B. schlegelii* has a greater temporal activity range than previously documented. *Bothriechis schlegelii* moves most frequently at night, is capable of capturing mobile prey from daytime perches, and consumes diurnally- and nocturnally-active prey. An ability to consume prey during both night and day increases the importance of the role of *B. schlegelii* as a predator of small vertebrates.

CLEARCUTS AND GRAY TREEFROG LARVAE

D.J Hocking and R.D Semlitsch [2008, J. Herpetology 42(4): 689-698] note that clearcutting hurts populations of many amphibian species. However, gray treefrogs (*Hyla versicolor*) have shown a preference for breeding sites located in clearcuts near forested habitat. To test the implications of this preference, the authors examined gray treefrog tadpole performance in cattle tanks along a gradient from clearcut to forest habitat. This design was replicated at three experimental clearcut sites. Tadpole performance was measured as length of the larval period, size at metamorphosis, and survival. Also examined were the influences of temperature, periphyton productivity, and invertebrate predator abundances on tadpole performance. Time to metamorphosis was shorter in the clearcuts, but metamorphs tended to be smaller than metamorphs in the forest tanks. Survival was also greater in clearcuts than in the forest treatments. Higher temperatures in the clearcuts primarily contributed to tadpole performance whereas invertebrate predators did not appear to influence performance. Although clearcuts benefited tadpoles through higher survival and shorter larval periods, there are potential fitness consequences for small metamorphs emerging in clearcuts.

DEMOGRAPHICS OF AN ENDANGERED IGUANA

A. Gutsche and W. J. Streich [2009, J. Herpetology 43(1):105-113] studied the population biology of the spiny-tailed iguana (*Ctenosaura bakeri*) endemic to the Honduran island of Utila and previously assumed to be close to extinction. Here, for the first time, a comprehensive mapping of its overall distribution and nesting area is presented. The total range of *C. bakeri* comprised about 1,091 ha of mangrove swamp. Nesting sites were restricted to 109 ha of sandy coastal territory. Two closed capture-recapture models were used to estimate adult population densities at 35–78 and 72–114 adults/ha within three mangrove areas, respectively. Population densities were largely related to the presence of suitable retreats. Population estimates for the entire mangrove habitat based on these mean adult densities ranged from 57,823 to 93,826 individuals, far higher than earlier reports have suggested. Also, no evidence was found for an unbalanced demographic structure. About 27% of all iguanas captured were juveniles (<150 mm snout–vent length). Notably, juveniles were difficult to detect and capture, and additional sightings of 0.8–2.3 juveniles/day indicated even higher abundances than given by captures. The sex ratio of males to females (1 : 1.2) was consistent with reports of adult social groups in other large iguanids. Threats to *C. bakeri* included hunting and habitat pollution but mainly the loss of habitat and nesting sites caused by unrestricted property development. Without proper habitat management, the authors anticipate significant declines of the *C. bakeri* population within the next 20 years.

DESERT IGUANAS LOSE SLEEP OVER SIDEWINDERS

T. K. Revell and W. K. Hayes [2009, J. Herpetology 43(1):29-37] note that all animals studied to date exhibit sleep or sleep-like behavior, but sleeping animals are at risk because they are generally unaware of and unresponsive to the environment. Selection should favor animals that make good trade-offs between sleep attributes (e.g., location, timing, duration) and predation risk; in other words, sleep should be facultative. The few studies that document sleep plasticity in response to predation risk have focused on endothermic vertebrates. The authors tested the hypothesis that a representative ectothermic vertebrate, the desert iguana (*Dipsosaurus dorsalis*), exhibits behavioral sleep plasticity in response to predation risk. They found a reduction (>50%) in total sleep time during daylight when desert iguanas were exposed continuously to a sidewinder (*Crotalus cerastes*) in a laboratory setting. During asynchronous eye closure bouts, the eye of the iguana distant to the sidewinder was more often closed, whereas the proximal eye was more often open, suggesting unihemispheric sleep (which has not been confirmed yet in reptiles) to maintain vigilance. Desert iguanas spent more time aboveground and less time within their burrows when the sidewinder was present. Snake activity was minimal, with movements occurring just 1.1% of the time, suggesting that iguanas were not merely responding to a moving object. These findings suggest that desert iguanas will forgo sleep and remain vigilant when the potential for predation is increased. These findings illustrate the importance of ecology in shaping the behavior and probably the associated physiological and neurological attributes of sleep in ectothermic vertebrates.

Unofficial Minutes of the CHS Board Meeting, February 13, 2009

The meeting was called to order at 7:45 P.M. at the Schaumburg Public Library. Board members Deb Krohn, Aaron LaForge, Cindy Rampacek and Brad Trost were absent.

Officers' Reports

Recording Secretary: The minutes of the 1-16-09 board meeting were read by John Archer, corrections were made, and the minutes were accepted.

Treasurer: The January financial report was presented, discussed and accepted.

Membership Secretary: Mike Dloogatch reported that membership is at 547 and read a list of memberships expiring this month.

Vice-president: Jason Hood will not be at the general meeting. John will handle details regarding the speaker for this month. The list of speakers for the rest of the year is looking good.

Sergeant-at-arms: Attendance at the January meeting was 47.

Committee Reports

Shows:
- Project Exploration, Dinner with a Dinosaur, February 27
- Kids Expo, February 28–March 1.
- Reptile Rampage, March 8.
- Chicagoland Family Pet Expo, Arlington Racetrack, March 20–22. Steve Dale would like to interview a CHS member in connection with this event on Sunday, March 15, on his WGN radio program.
- Amazing Amphibians at the Notebaert: The museum would like members to act as docents whenever possible while this exhibit is in place.
- SEWERFest—more info to come.

The Great Lakes Pet Expo went extremely well, 8000 people through the door. A donation will be made to the CHS.

Adoptions: Dick Buchholz picked up 26 animals, all in good condition, to be adopted.

Old Business

Symposium 2009: Prices have been set, and registration forms are being finalized for mailing. Online registration and PayPal are being set up.

Vet list: discussion postponed until Aaron and Cindy are present.

ReptileFest: Everything is going smoothly. John will set a date for a meeting to finalize details. Linda has purchased puzzles to sell at 'Fest, and has drafted people to sell them.

Grants: The Grants Committee met and recommends 9 grants for a total of $4758.00. We have $275.00 in our restricted fund for grants. Jenny moved and Rick seconded to allot $4483.00 for the grants recommended by the committee. Approval was unanimous.

New Business

Notebaert cooperation: The acting CEO of the Notebaert Nature Museum would like to have more interaction with the CHS. Anyone with ideas regarding this should contact John Archer.

Big Apple offer: Big Apple Pet Supply is offering us the chance to join a new pet charity. Rick will look into the offer and report back to the board.

Dave McGowan's request: Dave is willing to let us use his camera and other equipment to film at 'Fest in return for a vendor table to sell his DVDs.

Chicago Parent Magazine: They are looking for ideas or tips on environmentally friendly birthday parties for kids, and sent a list of questions to be answered. Any suggestions or ideas, contact John Archer. He will follow up with the magazine.

Magnets need to be ordered for shows and for 'Fest. Rick will work with Cindy on this.

Renewing membership with The World Chelonian Trust: Rick moved and Jenny seconded to renew our membership in the World Chelonian Trust. The motion passed 6-2, with Rick, Linda, Andy, Jason and Jenny voting in favor and Mike and Dan voting against.

Round Table

Dick Buchholz said people have been asking when we will have PayPal available to pay for memberships. He would also like to see our newsletter back, possibly using email.

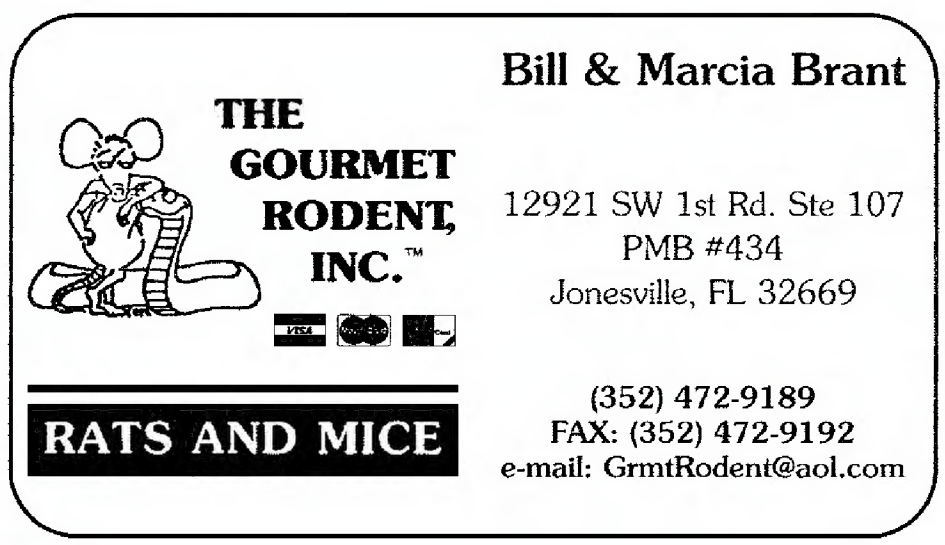
Bob Bavirsha did a photo shoot with one of his snakes which resulted in a donation to the CHS. He also found homes for several animals with the Scoville Zoo in Decatur, Illinois.

Ty Park said he has missed being an active part of the CHS, and would like to extend his appreciation to the board for all of their hard work for the organization.

John Archer told the board that we have received a check from ZooMed for their sponsorship of 'Fest.

The meeting adjourned at 9:45 P.M.

Respectfully submitted by Jenny Vollman for Cindy Rampacek



Advertisements

For sale: rats and mice—pinkies, fuzzies and adults. Quantity discounts. Please send a SASE for pricelist or call Bill Brant, *THE GOURMET RODENT*, 6115 SW 137th Avenue, Archer FL 32618, (352) 495-9024, E-mail: GrmtRodent@aol.com.

For sale: from **The Mouse Factory**, producing superior quality, frozen feeder mice and rats. Our mice and rats are vacuum-packed to greatly extend freezer life by reducing freezer burning and preserving vitamin and nutrient content. We feed our colony a nutrtionally balanced diet of rodent chow, formulated especially for us, and four types of natural whole grains and seeds. For a complete price list please visit our web site, www.themousefactory.com. We accept all major credit cards, PayPal or money orders. Call us **toll-free** (800) 720-0076 or send us an e-mail at info@themousefactory.com. Write us at PO Box 85, Alpine TX 79831.

For sale: **high quality frozen feeders**. Over a decade of production and supply. Seven sizes of mice availabe: small newborn pinks up to jumbo adults. Prices start at $25 per 100. Feeders are separate in the resealable bag, not frozen together. Low shipping rates. Free price list. Kelly Haller, 4236 SE 25th Street, Topeka KS 66605, (913) 234-3358 evenings and weekends.

For sale: Rats—live or frozen. I breed rats for my collection of boas so only top quality lab chow and care will do, I'm now offering surplus animals for sale. Located in far south suburbs of Chicago. Only orders of 20 or more please, no large rats will be available. For current availability and prices, please e-mail Steve at smuys@sbcglobal.net.

For sale: books. Archie Carr, "Caribbean Green Turtle" in June 1967 issue of *National Geographic*, 15 pp., 16 color photos (with Archie Carr in several of them), deals with Carr's work on the green turtle at Tortuguero in Costa Rica, cover worn, but article in good shape, (s), $7; A. John Coventry and Peter Robertson, *The Snakes of Victoria*, 1991, 70 pp., many color photos, range maps, 6 figs., descriptions and natural history info, published by Museum of Victoria (Australia) (s), $35; James R. Dixon, *Amphibians and Reptiles of Texas* with keys, taxonomic synopses, bibliography (32 pp., literature from 1852-1982), and distribution maps, 1987, 434 pp., 25 b&w photos (s), $10; James F. Keefe, *The World of the Opossum*, 1967, 144 pp., many b&w photos, no DJ, (h), $20; Frank M. Chapman, *Color Key to North American Birds*; 1912, 356 pp., almost 800 drawings by Chester Reed, (h), $20. h=hardbound, s=softbound. All books in excellent condition unless otherwise indicated. $3 postage and handling for orders under $25, free for orders $25 and over. William R. Turner, 7395 S. Downing Circle W., Centennial, CO 80122. e-mail: toursbyturner@aol.com; telephone (303) 795-5128.

For sale: Well started 2008 C.H. Sri Lankan stars, leopard tortoises and pancake tortoises. All captive-hatched by us and eating great. Stars are $450 each, with temperature-sexed pairs from unrelated females available. Leopards are $125 each and pancakes are $350. Contact Jim or Kirsten Kranz at 262-654-6303 or e-mail KKranz1@wi.rr.com.

For sale: Trophy quality jungle carpet, diamond-jungle, and jaguar carpet pythons. Website: moreliapython.googlepages.com E-mail: junglejohn@tds.net

For sale: Well started spider morph ball pythons (*Python regius*) available for free delivery in the Chicagoland area—males, $350. Also available are high-contrast, Sarawak locality and Walnut × Sarawak pairing Borneo pythons (*Python breitensteini*). Pricing is based on male sex with $50 more for females, if available: 2007 high-contrast, $150; 2007 Sarawak, $175; 2006 Sarawak,$200, 2007 Walnut × Sarawak (melanistic Borneos), $125. All feeding on frozen thawed adult mice and/or rats. Shipping available as an additional cost, if needed. Details and helpful info on my website at www.richcrowleyreptiles.com Contact Rich Crowley at 708-646-4058 or email pogona31@yahoo.com.

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Snake sitting or boarding: Mild-mannered adult female reticulated python, 18 feet, needs you from May to fall 2009. We are searching a responsible person either to housesit with her in northern Michigan or care for her at your home (non-Illinois only). Must be willing to feed her rabbits and shed her. Attractive, flexible terms. For more details, contact Kathy Bricker, 231-627-4830 or kathyhomeaccount@hotmail.com

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Line ads in this publication are run free for CHS members—$2 per line for nonmembers. Any ad may be refused at the discretion of the Editor. Submit ads to: Michael Dloogatch, 6048 N. Lawndale Avenue, Chicago IL 60659, (773) 588-0728 evening telephone, (312) 782-2868 fax, E-mail: MADadder0@aol.com

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And it's so much fun to exhibit that you should be paying us!

ReptileFest 2009

April 4–5

UPCOMING MEETINGS

The next meeting of the Chicago Herpetological Society will be held at 7:30 P.M., Wednesday, March 25, at the Peggy Notebaert Nature Museum, Cannon Drive and Fullerton Parkway, in Chicago. **James Parham**, a postdoctoral research associate at the Field Museum of Natural History, will speak about "Historical and Ongoing Changes to Turtle Diversity and Distributions." Jim will show examples from his own travels and research, as well as from the work of others to illustrate how human activities impact our ability to reconstruct natural patterns of turtle diversity (through extinction), distribution (through extirpation and exotic introduction), and phylogenetic relationships (through genetic pollution).

At the April 29 meeting **Dave Barker** will speak to us about ball pythons. Dave and his wife Tracy own Vida Preciosa International, a facility renowned for captive-bred boas and pythons. Their recent *Ball Pythons: History, Natural History, Care and Breeding* is by far the most detailed and comprehensive book ever written about a single snake species. Dave loves to share his knowledge about the biology and husbandry of snakes, and he always manages to do so in a highly entertaining manner.

The regular monthly meetings of the Chicago Herpetological Society take place at Chicago's newest museum—the **Peggy Notebaert Nature Museum**. This beautiful building is at Fullerton Parkway and Cannon Drive, directly across Fullerton from the Lincoln Park Zoo. Meetings are held the last Wednesday of each month, from 7:30 P.M. through 9:30 P.M. Parking is free on Cannon Drive. A plethora of CTA buses stop nearby.

Board of Directors Meeting

Are you interested in how the decisions are made that determine how the Chicago Herpetological Society runs? And would you like to have input into those decisions? If so, mark your calendar for the next board meeting, to be held at 7:30 P.M., April 17, in the adult meeting room on the second floor of the Schaumburg Township District Library, 130 S. Roselle Road, Schaumburg.

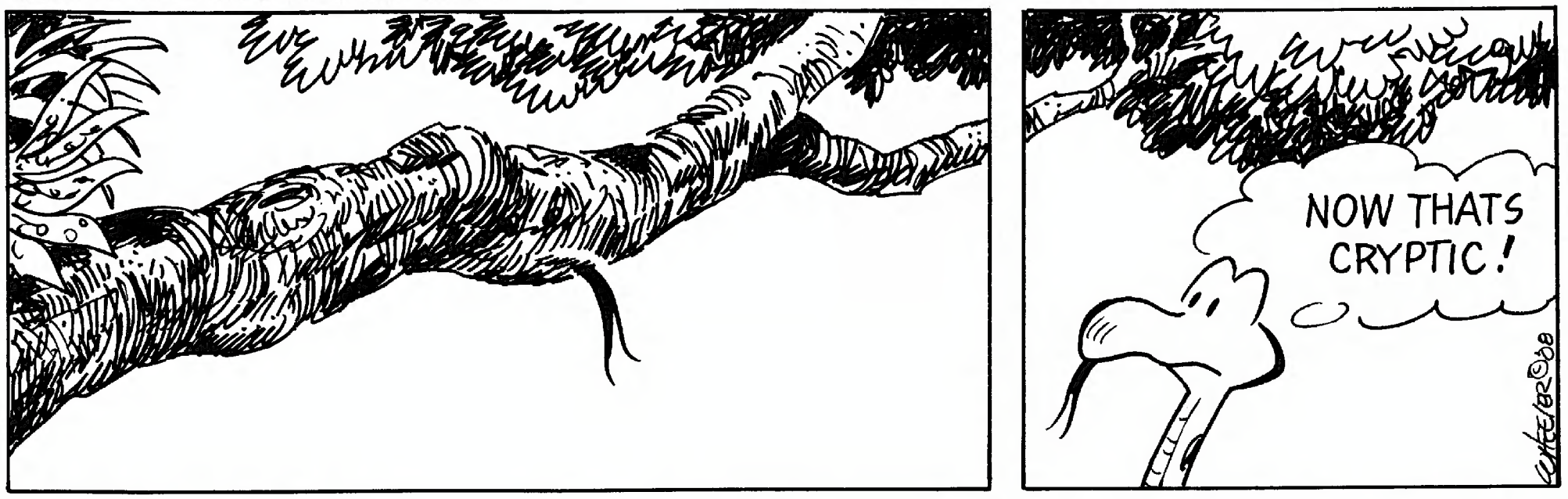
The Chicago Turtle Club

The monthly meetings of the Chicago Turtle Club are informal; questions, children and animals are welcome. Meetings normally take place at the North Park Village Nature Center, 5801 N. Pulaski, in Chicago. Parking is free. For more info visit the CTC website: http://www.geocities.com/~chicagoturtle.

2009 SALAMANDER SAFARI

This year, the annual CHS Salamander Safari will be held on Saturday, March 28, 10 A.M. – 3 P.M., beginning at the Plum Creek Nature Center at Goodenow Grove Forest Preserve in Will County. Goodenow Grove is south of Crete, Illinois, 1¼ miles east of the intersection of Route 1 and Route 394 on Goodenow Road. If you need directions to get to this area, call the nature center at (708) 946-2216. Species found or heard calling in previous inventories include spotted salamanders, blue-spotted salamanders, gray treefrogs, spring peepers, chorus frogs, bullfrogs, green frogs, and northern leopard frogs. Species not yet found but possibly occurring (or occurring at preserves nearby) include newts and wood frogs. As in past safaris, CHS members are encouraged to bring interesting amphibians from their personal collections for photography and display purposes. Coffee, juice and donuts will be provided, and a good time will be had by all!

THE ADVENTURES OF SPOT



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